ACOUSTICAL SITE ASSESSMENT
STARCO FOOD MART
S06-026, LOG NO. 06-19-021, APN579-191-25 & 61
SPRING VALLEY, CA

Submitted to:

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ISE Project #07-034

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

This acoustical site assessment analyzes the 0.55-acre project site located in the Community of Spring Valley, within the County of San Diego. The project seeks to put in a food mart building and four gas pump islands. Our findings indicate that there would be no acoustical impacts to the adjacent properties.

INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The project site consists of approximately 0.55 acres located in the Community of Spring Valley, within the County of San Diego, California. The project is located east of State Route 125 (SR-125). Jamacha Boulevard provides regional access to the project area from SR-125 to the west as can be seen in Figure 1 below.

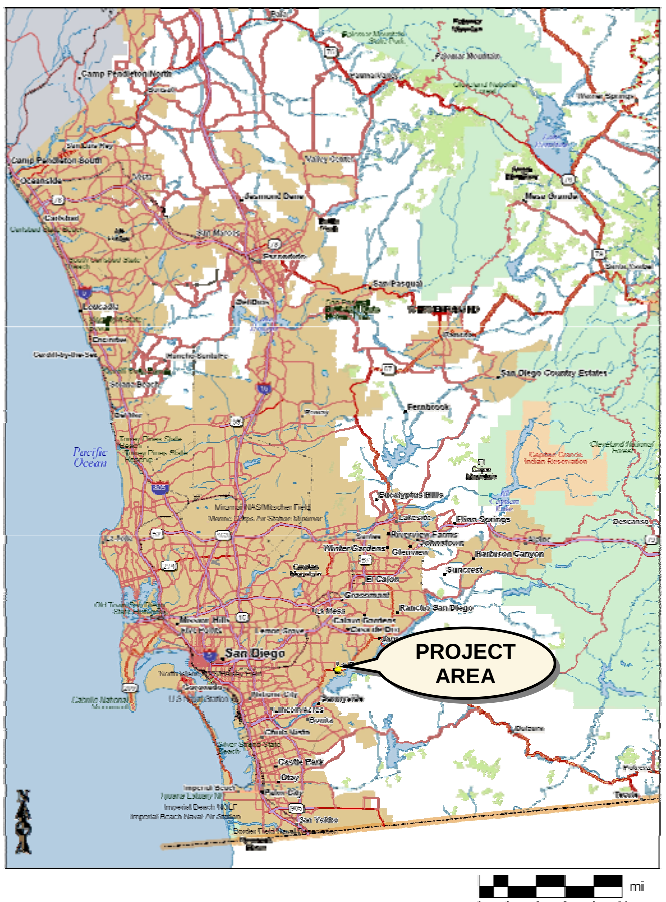

FIGURE 1: Project Vicinity Map (ISE 7/07)

The surrounding land uses to the proposed project are currently designated as follows: to the north/northwest and east is residential zoning, to the west and south is commercial zoning. Elevations on the entire property range from approximately 328 to 332 feet above mean sea level (MSL) as shown in Figure 2 below.

FIGURE 2: Project Site Location Map w/ Topography (ISE 7/07)

Project Description

The proposed STARCO Food Mart is a Site Plan that calls for a 1,664 square foot Food Mart in the center of the site, and four gas pumping islands as can be seen in Figure 3 below. The site will have 10 parking spaces with one being designated as handicap. The site currently contains no structures with a proposed 6 foot high wood fence at the north property line.

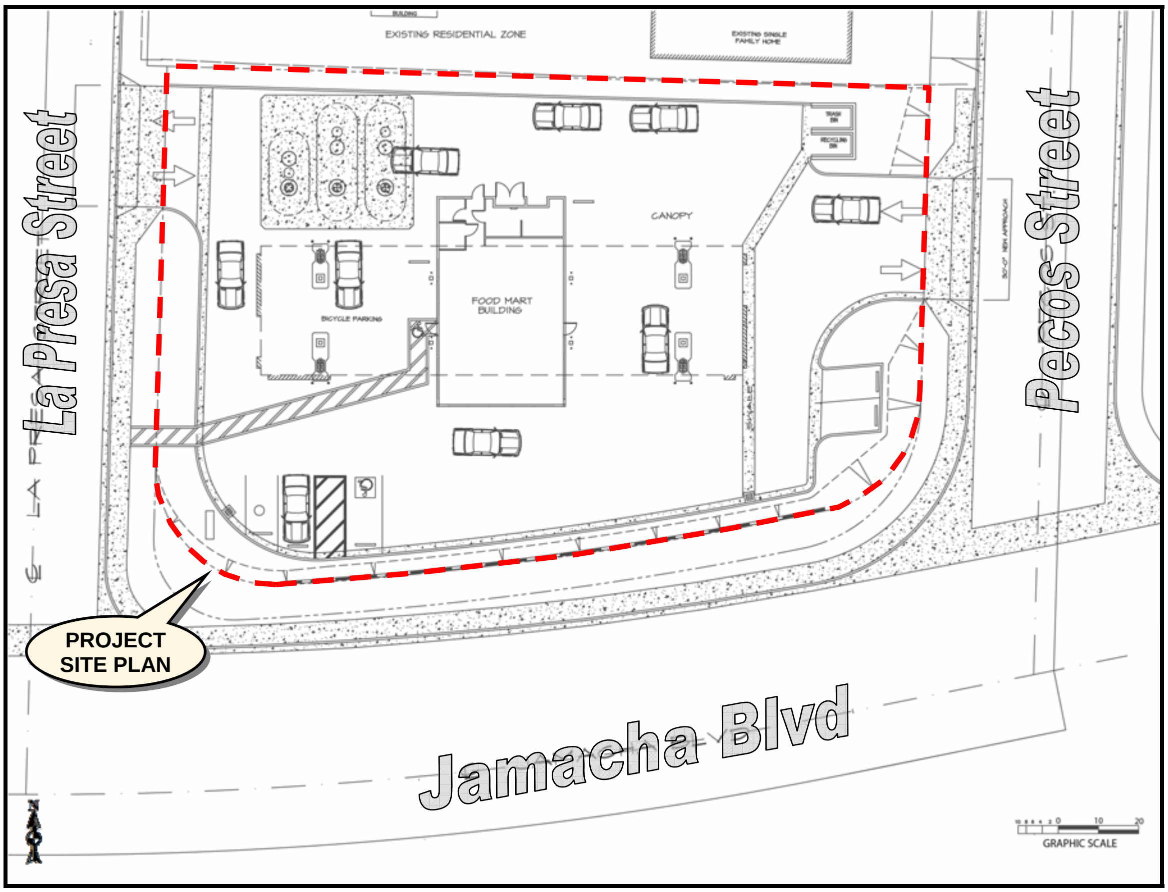

FIGURE 3: Proposed Site Plan – STARCO Food Mart (Gary Engineering 2/07)

Acoustical Definitions

Sound waves are linear mechanical waves. They can be propagated in solids, liquids, and gases. The material transmitting such a wave oscillates in the direction of propagation of the wave itself. Sound waves originate from some sort of vibrating surface. Whether this surface is the vibrating string of a violin or a person's vocal cords, a vibrating column of air from an organ or clarinet, or a vibrating panel from a loudspeaker, drum, or aircraft, the sound waves generated are all similar. All of these vibrating elements alternatively compress the surrounding air on a forward movement and expand it on a backward movement.

There is a large range of frequencies within which linear waves can be generated, sound waves being confined to the frequency range that can stimulate the auditory organs to the sensation of hearing. For humans this range is from about 20 Hertz (Hz or cycles per second) to about 20,000 Hz. The air transmits these frequency disturbances outward from the source of the wave. Sound waves, if unimpeded, will spread out in all directions from a source. Upon entering the auditory organs, these waves produce the sensation of sound. Waveforms that are approximately periodic or consist of a small number of periodic components can give rise to a pleasant sensation (assuming the intensity is not too high), for example, as in a musical composition.

Noise, on the other hand, can be represented as a superposition of periodic waves with a large number of components and is generally defined as unwanted or annoying sound that is typically associated with human activity and which interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day, and the sensitivity of the individual hearing the sound.

Airborne sound is a rapid fluctuation of air pressure above and below atmospheric levels. The loudest sounds that the human ear can hear comfortably are approximately one trillion (or $1x10^{12}$) times the acoustic energy that the ear can barely detect. Because of this vast range, any attempt to represent the acoustic intensity of a particular sound on a linear scale becomes unwieldy. As a result, a logarithmic ratio originally conceived for radio work known as the decibel (dB) is commonly employed[1].

A sound level of zero "0" dB is scaled such that it is defined as the threshold of human hearing and would be barely audible to a human of normal hearing under extremely quiet listening conditions. Such conditions can only be generated in anechoic or "dead rooms". Typically, the quietest environmental conditions (extreme rural areas with extensive shielding) yield sound levels of approximately 20 decibels. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB roughly correspond to the threshold of pain.

The minimum change in sound level that the human ear can detect is approximately 3.0 dBA.[2] A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sounds loudness[3]. A change in sound

[1] A unit used to express the intensity of a sound wave. This level is defined as being equal to 20 times the common logarithm of the ratio of the pressure produced by a sound wave of interest to a 'reference' pressure wave (which is defined as 1 micro Pascal measured at a distance of 1 meter).

[2] Every 3 dB equates to a 50% of drop (or increase) in wave strength, therefore a 6 dB drop/increase = a loss/increase of 75% of total signal strength and so on.

[3] This is a subjective reference based upon the nonlinear nature of the human ear.

level of 10 dB actually represents an approximate 90 percent change in the sound intensity, but only about a 50 percent change in the perceived loudness. This is due to the nonlinear response of the human ear to sound.

As mentioned above, most of the sounds we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds consists of determining all of the frequencies of a sound according to a weighting system that reflects the nonlinear response characteristics of the human ear. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of sounds from distant sources that create a relatively steady background noise in which no particular source is identifiable. For this type of noise, a single descriptor called the Leq (or equivalent sound level) is used. Leq is the energy-mean A-weighted sound level during a measured time interval. It is the ‘equivalent’ constant sound level that would have to be produced by a given source to equal the average of the fluctuating level measured. For most acoustical studies, the monitoring interval is generally taken as one-hour and is abbreviated *Leq-h*.

To describe the time-varying character of environmental noise, the statistical noise descriptors L10, L50, and L90 are commonly used. They are the noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time. Sound levels associated with the L10 typically describe transient or short-term events, while levels associated with the L90 describe the steady state (or most prevalent) noise conditions. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum and minimum measured sound level (Lmax and Lmin) indicators. The Lmin value obtained for a particular monitoring location is often called the *acoustic floor* for that location.

Finally, another sound measure employed by the State of California and the County of San Diego is known as the Community Noise Equivalence Level (CNEL) is defined as the “A” weighted average sound level for a 24-hour day. It is calculated by adding a 5-decibel penalty to sound levels in the evening (7:00 p.m. to 10:00 p.m.), and a 10-decibel penalty to sound levels in the night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours.

APPLICABLE SIGNIFICANCE CRITERIA

California Environmental Quality Act (CEQA) Thresholds

Section 15382 of the California Environmental Quality Act (CEQA) guidelines defines a significant impact as,

> *"… a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."*

The minimum change in sound level that the human ear can detect is approximately 3-dBA. This increment, 3-dBA, is commonly accepted under CEQA as representing the point where a noise level increase would represent a significant impact. This impact threshold is accepted by the County of San Diego and will be used as the significance threshold to determine a projects impact on the affected (existing) environment.

County of San Diego Vehicular/Transportation Noise Impact Thresholds

Transportation noise levels, such as those produced by vehicles traveling to and from the project site, are governed under Policy 4b of the *County of San Diego's Noise Element of the County's General Plan (as revised 7/06)*. The relevant sections of the Noise Element are cited below:

> Because exterior community noise equivalent levels (CNEL) above 60 decibels and/or interior CNEL above 45 decibels may have an adverse effect on public health and welfare, it is the policy of the County of San Diego that:
>
> 1. Whenever it appears that new *development* may result in any (existing or future) *noise sensitive land use* being subject to noise levels of CNEL equal to 60 *decibels (A)* or greater, an acoustical analysis shall be required.
> 2. If the acoustical analysis shows that noise levels at any *noise sensitive land use* will exceed CNEL equal to 60 decibels, modifications shall be made to the *development* which reduce the *exterior noise* level to less than CNEL of 60 *decibels (A)* and the *interior noise* level to less than CNEL of 45 *decibels (A)*[4].
> 3. If modifications are not made to the *development* in accordance with paragraph 2 above, the *development* shall not be approved unless a finding is made that there are specifically identified overriding social or economic

[4] **Action Program 4b1:** Recommend programs to soundproof buildings or redevelop areas where it is impossible to reduce existing source noise to acceptable levels.

Action Program 4b2: Study the feasibility of extending the application of Section 1092, California Administrative Code dealing with noise insulation standards to single-family dwellings, and incorporating higher standards for reduction of exterior noise intrusion into structures.

Action Program 4b3: Require present and projected noise level data to be included in Environmental Impact Reports. Designs to mitigate adverse noise impacts shall also be used.

considerations which warrant approval of the development without such modification; provided, however, if the acoustical study shows that sound levels for any noise sensitive land use will exceed a CNEL equal to 75 *decibels (A) even* with such modifications, the *development* shall not be approved irrespective of such social or economic considerations.

Definitions, Notes and Exceptions

"Decibels (A)" refers to A-weighted sound levels as noted on page VIII-2 within the Element.

"Development" means any physical development including but not limited to residences, commercial, or industrial facilities, roads, civic buildings, hospitals, schools, airports, or similar facilities.

"*Exterior noise*":

(a) For single family detached dwelling projects, "exterior noise" means noise measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

(i) Net lot area up to 4,000 sq. ft.:	400 square feet.
(ii) Net lot area 4,000 sq. ft. to 10 ac.:	10% of net lot area.
(iii) Net lot area over 10 ac.:	1 ac.

(b) For all other projects, "exterior noise" means noise measured at all exterior areas, which are provided for group or private usable, *open space* purposes.

(c) For County road construction projects, the exterior noise level due to vehicular traffic impacting a noise sensitive area should not exceed the following values:

(i) Federally funded projects: The Noise standard contained in applicable Federal Highway Administration Standards.

(ii) Other projects: 60 *decibels (A),* except if the existing or projected noise level without the project is 58 decibels (*A*) or greater, a 3 *decibel* (*A*) increase is allowed, up to the maximum permitted by Federal Highway Administration Standards.

"Group or Private Usable Open Space" shall mean: Usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways (Group Usable Open Space); and usable open space intended for use of occupants of one dwelling unit, normally including yards, decks and balconies (Private Usable Open Space).

"Interior noise": The following exception shall apply: For rooms which are usually occupied only a part of the day (schools, libraries, or similar), the interior one-hour average sound level, due to noise outside, should not exceed 50 *decibels (A)*.

"Noise sensitive land use" means any residence, hospital, school, hotel, resort, library or any other facility where quiet is an important attribute of the environment.

Operational Noise Standards

The San Diego County Noise Ordinance Section 36.404 governs fixed source and/or operational noise. The applicable sound levels are a function of the time of day and the land use zone. Sound levels are measured at the boundary of the property containing the noise source. The relevant limits are shown in Table 1 below. In the case where two adjacent property lines differ in zoning, the applicable threshold would be the arithmetic average of the two standards. If the ambient sound levels are consistently higher then zonal property line standards, then the ambient conditions would be the property line standard. This standard would be applied during all hours of operation.

TABLE 1: County of San Diego Noise Ordinance Limits

Land Use Zone	Time of Day	1-Hour Average Sound Level (dBA Leq)
R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-88, S-90, S-92, R-V, and R-U	7 am to 10 pm 10 pm to 7 am	50 45
R-R0, R-C, R-M, C-30, and S-86	**7 am to 10 pm** **10 pm to 7 am**	**55** **50**
S-94 and other commercial zones	**7 am to 10 pm** **10 pm to 7 am**	**60** **55**
M-50, M-52, and M-54	any time	70
S-82 and M-58	any time	70

Source: County of San Diego Noise Ordinance Section 36.404, 1981.

The proposed STARCO Food Mart development is zoned C-36 (General Commercial). The standard for this zoning would be a one-hour average sound level of 60 dBA between the hours of 7 am and 10 pm and a one-hour average sound level of 55 dBA between the hours of 10 pm and 7 am. Adjacent land use to the north/northwest and east are zoned Residential (strictest adjacent zoning) that allows a one-hour average sound level of 55.0 dBA between the hours of 7 am and 10 pm and a one-hour average sound level of 50.0 dBA between the hours of 10 pm and 7 am. Thus, because of the two zones being adjacent to each other the arithmetic average will have the most stringent one-hour average sound level of 52.5 dBA between the hours of 10 pm and 7 am at the property line.

ANALYSIS METHODOLOGY

Existing Conditions Field Survey

A Quest Model 2900 ANSI Type 2 integrating sound level meter was used as the data collection device. The meter was mounted to a tripod five-feet above ground level in order to simulate the noise exposure of an average-height human being. One short-term sound level measurement was taken on the proposed site as described below. The monitoring location is shown below in Figure 4.

FIGURE 4: Ambient Onsite Monitoring Locations – STARCO Food Mart (ISE 7/07)

The monitoring location (denoted as ML 1) was selected in the southern portion of the project site roughly 34 feet north of Jamacha Boulevard. Onsite monitoring was performed in this manner in order to obtain an estimate of the worst-case existing onsite noise levels during normal daytime traffic conditions. The monitoring site was spatially logged using a geographic positioning system (GPS) to maintain both horizontal and vertical control.

Additionally, a second monitoring location was taken at a typical gas station within the neighborhood in order to quantify ambient noise levels due to typical activities of this type. The selected monitoring site is shown in Figure 5 on the following page along with an inset location map.

The measurement was performed on June 11, 2007. All equipment was calibrated before testing at ISE's acoustics and vibration laboratory to verify conformance with ANSI S1-4 1983 Type 2 and IEC 651 Type 2 standards.

Traffic Segment Impact Assessment Approach

The ISE *RoadNoise v2.0* traffic noise prediction model which is based upon Caltrans Sound 32 Traffic Noise Prediction Model with California (CALVENO) noise emission factors (based on FHWA RD-77-108 and FHWA/CA/TL-87/03 standards) was used to calculate the increase in vehicular traffic noise levels along major servicing roadways due to the proposed STARCO Food Mart project. The model assumed a 'hard-site' propagation rule (i.e., 3.0 dBA loss per doubling of distance (DD) between source and receiver), thereby yielding a representative worst-case noise contour set.

Traffic noise model input included a tabulation of the major servicing roadway alignments identified in the aforementioned project traffic study as well as intersection turning movement and segment diagrams which were analytically reduced to peak hour traffic movements and ultimately daily segment ADT levels assuming a 10% flow pattern and a 96/2/2 (automobile/medium-truck/heavy-truck) mix. Modeled traffic speeds represent observed and future predicted average values as verified by SANDAG.

Onsite Noise Analysis Procedure

Dominant onsite noise sources, consisting of observed typical gas pump island noise levels and HVAC's were modeled using the ISE *Industrial Source* computation model *Version 3* (*IS3*). The IS3 model calculates the predicted acoustic field pattern using a vector-based summation of all source-receptor pairs. The resulting output consists of an isogram containing the predicted acoustic field accounting for refraction and structural attenuation.

All other onsite sources were assumed located internally to the project-proposed structures and therefore not directly impacting any property lines. These sources would include, but not be limited to, cashier activities, talking customers, etc.

FIGURE 5: Gas Pump Island Operational Noise Measurement (ISE 7/07)

The proposed Commercial portion of the project is expected to utilize one (4-ton) fixed source HVAC unit (i.e. Carrier 48HJ) for heating and cooling demands. HVAC's were modeled at 76 dBA at a reference of 3 feet (refer to attached cut sheet). The location of this rooftop HVAC will be located at the southern portion of the roofline as can be seen in Figure 6 on the following page.

Additionally, gas pump islands were modeled after collected field data (refer to section: *Ambient Sound Measurement Results*) at a neighboring gas station (refer to Figure 5 above). The locations of the modeled gas pump islands can also be seen in Figure 6.

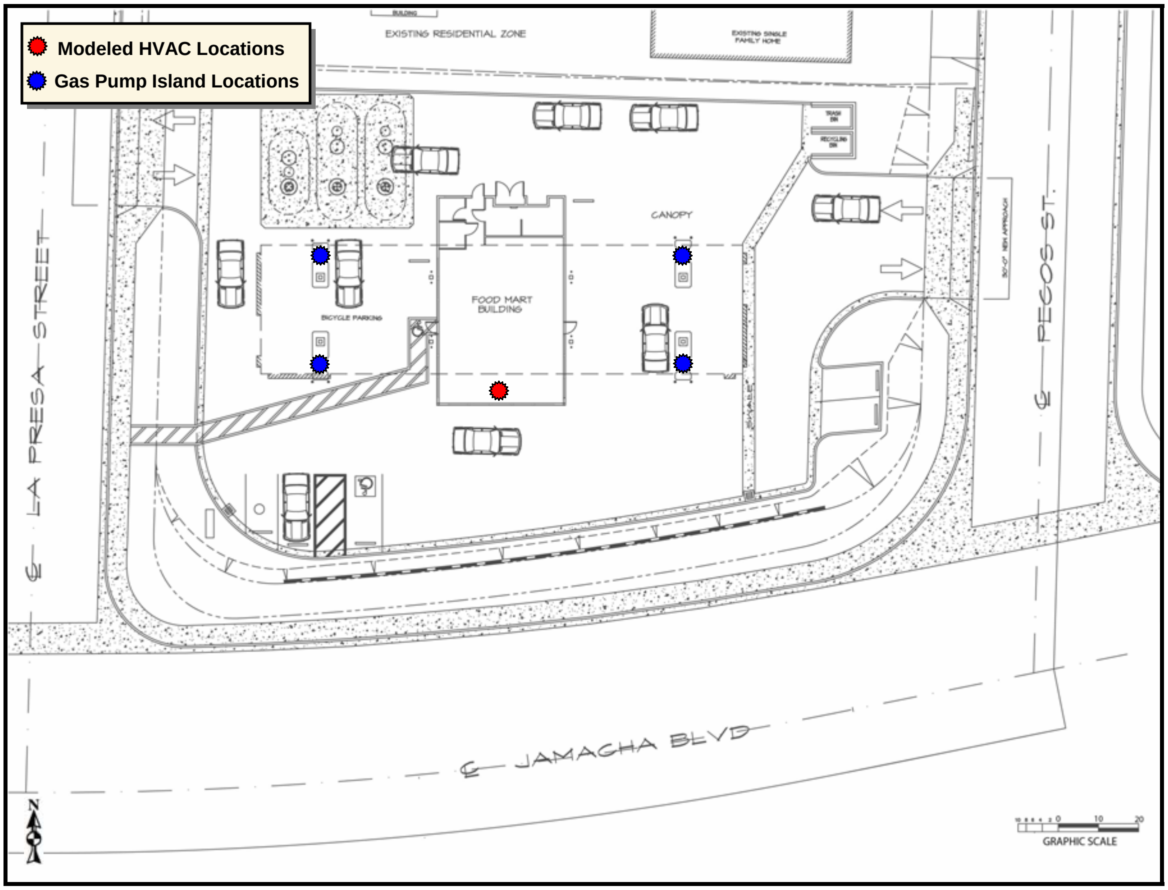

FIGURE 6: Proposed HVAC & Gas Pump Island Locations for STARCO Food Mart (ISE 7/07)

The operation of these units was examined for compliance with applicable property line noise standards based upon the current engineering design. It should be noted that functionally not every gas pump island would be operating simultaneously, however, this condition was analyzed since it constitutes a worst-case assumption under CEQA.

FINDINGS / RECOMMENDATIONS

Ambient Sound Measurement Results

Testing conditions during the monitoring period were sunny with an average barometric pressure reading of 30.01 in-Hg, an average westerly wind speed of 0 to 1 miles per hour (MPH) and an approximate mean temperature of 74 degrees Fahrenheit. The results of one-hour sound level monitoring are shown in Table 2 below. The values for the energy equivalent sound level (Leq), the maximum and minimum measured sound levels (Lmax and Lmin), and the statistical indicators L10, L50, and L90, are given for each monitoring location.

TABLE 2: Measured Ambient Sound Levels – STARCO Food Mart Project Site

		1-Hour Noise Level Descriptors in dBA					
Site	**Start Time**	**Leq**	**Lmax**	**Lmin**	**L10**	**L50**	**L90**
ML 1	8:30 a.m.	60.8	74.6	46.5	61.4	59.5	57.0

Monitoring Location:

ML 1: Center of Project Site facing Jamacha Boulevard.
GPS: 32°42.482'N x 116°59.566'W, EPE 10 ft.

Measurements performed by ISE on July11, 2007. EPE = Estimated Position Error.

Measurements collected at the monitoring location ML 1 reflect the typical sound levels associated with the community setting with existing adjacent major roadway activities. The hourly average sound levels (or Leq-h) recorded over the monitoring period was 60.8 and was observed to be predominately due to surface street traffic.

As indicated by the monitoring equipment, at least 90 percent of the time (L90) the onsite sound level at ML 1 was approximately 57.0 dBA, respectively (again indicating the relative frequency of traffic along Jamacha Boulevard). The acoustic floor for the site, as seen by the Lmin indicator was found to be 46.5 dBA. This would be considered the lowest attainable sound levels for the project area near Jamacha Boulevard.

Noise levels solely at the pumps were found to average approximately 61 dBA at approximately 2.5 feet. The monitoring event at the fuel island was taken for a period of a complete full tank fueling timeframe. For modeling purposes the Leq-h was assumed to be the “worst-case” and most accurate representation of the fuel pump sound generation.

Predicted Vehicular Noise Levels along Adjacent Roadways

The results showing the effect of traffic noise increases on the various servicing roadway segments associated with the proposed STARCO Food Mart are presented in Tables 3a through -c for the following scenarios:

Table 3a)	Existing Traffic Noise Conditions
Table 3b)	Existing plus Project Traffic Noise Conditions
Table 3c)	Existing plus Project Related Traffic Noise Increases

For each roadway segment examined in Tables 3a through -c, the worst case average daily traffic volume (ADT) and observed/predicted speeds are shown along with the corresponding reference noise level at 50-feet (in dBA). Additionally, the line-of-sight distance to the 60 and 65 dBA CNEL contours from the roadway centerline are provided as an indication of the worst-case unobstructed theoretical traffic noise contour placement.

As can be seen from the traffic data, the largest project-related traffic noise increase would be 3.0 dBA CNEL along La Presa Avenue. Although at the threshold of the CEQA 3.0 dBA *rule of thumb* threshold, this would not constitute an impact since the overall level is below the County's 60 dBA CNEL residential standard.

TABLE 3a: Existing Traffic Noise Conditions

				CNEL Contour Distances (feet)	
Roadway Segment	**ADT**	**Speed (MPH)**	**SPL**	**65 dBA Contour**	**60 dBA Contour**
Jamacha Boulevard					
La Presa Ave to Maria Ave	21,100	45	72.5	280	885
La Presa Ave to Pecos St	19,600	45	72.2	260	822
Pecos St to Clamath St	18,900	45	72.0	251	793
La Presa Avenue					
Jamacha Blvd to Project Dwy	800	25	53.9	4	12
Pecos Street					
Jamacha Blvd to Project Dwy	700	25	53.4	3	11

Notes:

- ADT = Average Daily Trips - Source: Katz, Okitsu & Associates, 1/07.
- SPL = Sound Pressure Level in dBA at 50-feet from the road edge. CNEL = Community Noise Exposure Level.
- All values given in dBA CNEL. Contours assumed to be line-of-sight perpendicular (⊥) distance.

TABLE 3b: Existing plus Project Traffic Noise Conditions

Roadway Segment	ADT	Speed (MPH)	SPL	CNEL Contour Distances (feet) 65 dBA Contour	60 dBA Contour
Jamacha Boulevard					
La Presa Ave to Maria Ave	21,500	45	72.6	285	902
La Presa Ave to Pecos St	19,800	45	72.2	263	831
Pecos St to Clamath St	19,400	45	72.1	257	814
La Presa Avenue					
Jamacha Blvd to Project Dwy	1,600	25	56.9	8	25
Pecos Street					
Jamacha Blvd to Project Dwy	1,000	25	54.9	5	15

Notes:

- ADT = Average Daily Trips - Source: Katz, Okitsu & Associates, 1/07.
- SPL = Sound Pressure Level in dBA at 50-feet from the road edge. CNEL = Community Noise Exposure Level.
- All values given in dBA CNEL. Contours assumed to be line-of-sight perpendicular (⊥) distance.

TABLE 3c: Existing plus Project Related Traffic Noise Increases

Roadway Segment	Existing (SPL)	Existing plus Project (SPL)	Project Related Difference (SPL)
Jamacha Boulevard			
La Presa Ave to Maria Ave	72.5	72.6	0.1
La Presa Ave to Pecos St	72.2	72.2	0.0
Pecos St to Clamath St	72.0	72.1	0.1
La Presa Avenue			
Jamacha Blvd to Project Dwy	53.9	56.9	3.0
Pecos Street			
Jamacha Blvd to Project Dwy	53.4	54.9	1.5

Notes:

- SPL = Sound Pressure Level in dBA at 50-feet from the road edge. CNEL = Community Noise Exposure Level.
- All values given in dBA CNEL. Contours assumed to be line-of-sight perpendicular (⊥) distance.

Expected Outdoor Operational Noise Levels

Finally, utilizing the ISE *IS3* noise field model, a rectangular grid of receptor points within the vicinity of the commercial HVAC units and gas pump island source locations were created with the resultant radiated sound level calculated at each point. The results are shown as a color contour plot superimposed atop the proposed site plan. The model input deck and output plot is provided as an attachment to this report. The worst-case noise exposure contours for all fixed stationary sources are identified in Figure 7 on the following page. Table 4 below this figure shows the predicted sound level for points identified within Figure 7.

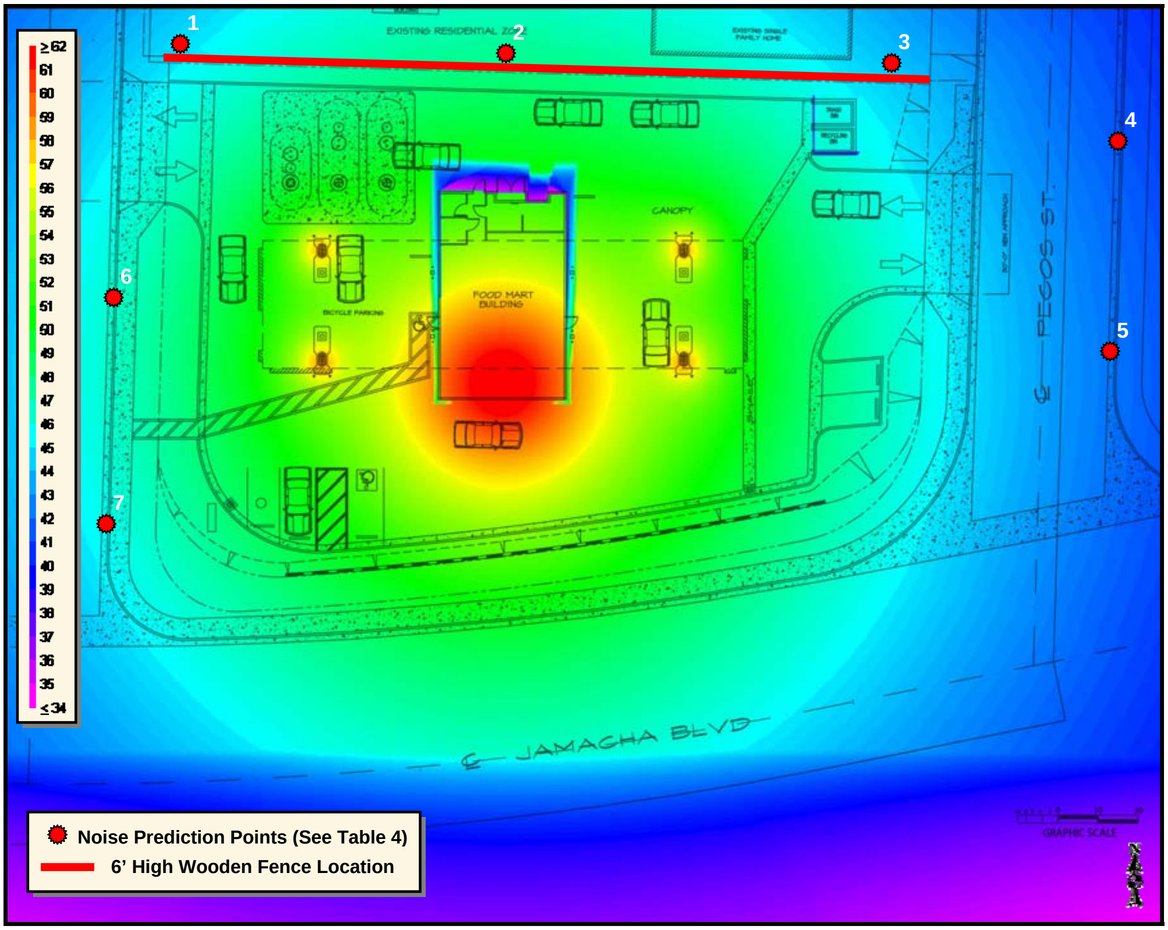

FIGURE 7: Operational Noise Exposure Contour Plot in dBA for Proposed Project Site (ISE 7/07)

TABLE 4: Receptor Sound Level Prediction Chart

Sampling Location Shown in Figure 6 Above	Property Line	Predicted Sound Pressure Level (dBA)
1	Northwest	44.6
2	North	47.7
3	Northeast	44.3
4	East	41.8
5	East	42.2
6	West	45.2
7	West	45.9

The attenuation characteristics of the model assumed a masonry- wall along the northern property line. The proposed 6-foot wall would not provide any significant attenuation but the proposed project would still not exceed any adjacent property line noise limits with or without this wall. The color-shaded areas for Figure 7 represent areas of equal noise exposure within the roofline and surrounding property and are a composite of the 299,845 data points generated by the computer model.

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE) located at 16486 Bernardo Center Drive, Suite 278, San Diego, CA 92128. The members of its professional staff contributing to the report are listed below:

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ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (858) 451-3505.

Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810. Original reports contain non-photo blue ISE watermark at the bottom of each page.

Approved as to Form and Content:

Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc.

Attachments to this report: *IS3 Model Input/Output Data*

IS3 Model Input / Output Data

```
STARCO FOOD MART
0 = START X POINT IN FEET
0 = START Y POINT IN FEET
287 = END X POINT IN FEET
227 = END Y POINT IN FEET
5 = NUMBER OF SOURCE POINTS
500 = DOMINANT FREQUENCY OF SOURCE IN HZ
3 = REFERENCE DISTANCE IN FEET
0.5 = DISTANCE BETWEEN STEPS
14 = NUMBER OF BARRIER PAIRS
5 = RECEPTOR ELEVATION IN FEET
SOURCE POINTS IN FEET (XYZ - LEVEL IN DBA)
168,167,4,59.4
168,139,4,59.4
78,167,4,59.4
78,139,4,59.4
123,134,13,76
BARRIER SOURCE PAIRS IN FEET (START XY - END XY - HEIGHT - STC)
40,214,225,208,6,0
107,129,108,182,10,0
108,182,129,181,10,0
129,181,129,179,10,0
129,179,134,179,10,0
134,179,134,181,10,0
134,181,139,181,10,0
139,181,139,129,10,0
139,129,107,129,10,0
200,205,211,205,6,0
211,205,211,191,6,0
211,191,200,191,6,0
200,191,200,205,6,0
-1000,-900,-900,-900,0,0
END OF INPUT FILE - REV 3.1
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INPUT DECK

OUTPUT PLOT